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# **Pacific Scientific PC830 Servo Drive**

## **Application Note**

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This document describes how to configure a Paradigm operator interface terminal to allow communications with a Pacific Scientific PC830 Servo Drive. The communications protocol supports access to drive commands and variables. Please read this document carefully before attempting to configure communications with these devices.

## Introduction

The EDICT-97 configuration software has been designed to allow the user to enter an identifier in a manner that should be familiar to the user of a Pacific Scientific PC830. The driver allows the exchange of data with the drive.

## Accessing Data

The PC830 communications protocol allows access to a number of commands and variables over a serial communications link. The driver described here supports the commands and variables in the table below.

Identifier	Type	Identifier	Type	Identifier	Type
AccelLmt	Flt	CosHarmCoeff1	Flt	EncAlignRampIcmd	Int
ActiveAccelRate	Flt	CosHarmCoeff2	Flt	EncAlignTestDist	Int
ActiveDecelRate	Flt	CosHarmCoeff4	Flt	EncAlignTime	Int
ActiveDistance	Int	CosHarmCoeff5	Flt	EncFreq	Flt
ActiveDistOffset	Int	CosHarmCoeff7	Flt	EncIn	Int
ActiveDwell	Int	CosHarmCoeff8	Flt	EncInF0	Flt
ActiveHomeDir	Int	CosHarmCoeff10	Flt	EncMode	Int
ActiveHomeMode	Int	CosHarmCoeff11	Flt	EncOut	Int
ActiveMove	Int	CosHarmCoeff13	Flt	EncPos	Int
ActiveMoveType	Int	CosHarmCoeff14	Flt	ExtFault	Int
ActiveRegSelect	Int	CosHarmCoeff16	Flt	Fault	Int
ActiveRunSpeed	Flt	CosHarmCoeff17	Flt	FaultCode	Int
ADF0	Flt	CosHarmCoeff19	Flt	FaultReset	Int
ADOffset	Flt	CwInh	Int	FVelErr	Flt
AIn1Map	Int	DBG1	Int	FwV	Int
AIn2Map	Int	DBG2	Int	GearingOn	Int
AIn3Map	Int	DBG4	Int	HallState	Int
AInNull	Int	DbgI	Int	HomeSwitch	Int
AnalogILmt	Flt	DbgL	Int	HSTemp	Flt
AnalogILmtFilt	Flt	DbgVar0	Int	HwV	Int
AnalogILmtGain	Flt	DbgVar1	Int	ICmd	Flt
AnalogILmtOffset	Flt	DbgVar2	Int	IFB	Flt
AnalogIn	Flt	DbgVar3	Int	ILmtMinus	Int
AnalogOut1	Flt	DbgVar4	Int	ILmtMode	Int
AnalogOut2	Flt	DbgVar5	Int	ILmtPlus	Int
ARF0	Flt	DbgVar6	Int	ImMax	Flt
ARF1	Flt	DbgVar7	Int	Inp1	Int
ARZ0	Flt	DecelLmt	Flt	Inp2	Int
ARZ1	Flt	DigitalCmd	Int	Inp3	Int
AxisAddr	Int	DigitalCmdFreq	Flt	Inp4	Int
B1	Flt	DM1F0	Flt	Inp5	Int
B2	Flt	DM1Gain	Flt	Inp6	Int
BlkType	Int	DM1Map	Int	InpMap1	Int
Brake	Int	DM1Out	Flt	InpMap2	Int
CCDate	Int	DM2F0	Flt	InpMap3	Int
CCSNum	Int	DM2Gain	Flt	InpMap4	Int
CcwInh	Int	DM2Map	Int	InpMap5	Int
CfgD	Int	DM2Out	Flt	InpMap6	Int
CmdGain	Flt	EEInt	Int	InPosLimit	Int
CmdGain2	Flt	ElecAngTau	Int	Inputs	Int
CommEnbl	Int	Enable	Int	IntgStopThresh	Flt
CommOff	Flt	Enable2	Int	Ipeak	Flt
CommSrc	Int	Enabled	Int	IqCmd	Flt

Identifier	Type
IqFB	Flt
IqIH	Flt
IqMax	Flt
ItDerateIntercept	Flt
ItDerateSlope	Flt
ItF0	Flt
ItFilt	Flt
ItThresh	Int
ItThreshA	Flt
IU	Flt
IV	Flt
IW	Flt
K1	Flt
K2	Flt
KdEnc	Int
KiEnc	Int
Kii	Flt
Kip	Flt
KpEnc	Int
Kpp	Flt
Kvff	Flt
Kvi	Flt
Kvp	Flt
LoadCalTable	Cmd
MfgLock	Int
Model	Int
Motor1	Int
Motor2	Int
Move0AccelRate	Flt
Move0DecelRate	Flt
Move0Distance	Int
Move0DistOffset	Int
Move0Dwell	Int
Move0HomeDir	Int
Move0HomeMode	Int
Move0RegSelect	Int
Move0RunSpeed	Flt
Move0Type	Int
Move1AccelRate	Flt
Move1DecelRate	Flt
Move1Distance	Int
Move1DistOffset	Int
Move1Dwell	Int
Move1HomeDir	Int
Move1HomeMode	Int
Move1RegSelect	Int
Move1RunSpeed	Flt
Move1Type	Int
Move2AccelRate	Flt
Move2DecelRate	Flt
Move2Distance	Int
Move2DistOffset	Int
Move2Dwell	Int
Move2HomeDir	Int
Move2HomeMode	Int
Move2RegSelect	Int
Move2RunSpeed	Flt
Move2Type	Int
Move3AccelRate	Flt
Move3DecelRate	Flt
Move3Distance	Int

Identifier	Type
Move3DistOffset	Int
Move3Dwell	Int
Move3HomeDir	Int
Move3HomeMode	Int
Move3RegSelect	Int
Move3RunSpeed	Flt
Move3Type	Int
Move4AccelRate	Flt
Move4DecelRate	Flt
Move4Distance	Int
Move4DistOffset	Int
Move4Dwell	Int
Move4HomeDir	Int
Move4HomeMode	Int
Move4RegSelect	Int
Move4RunSpeed	Flt
Move4Type	Int
Move5AccelRate	Flt
Move5DecelRate	Flt
Move5Distance	Int
Move5DistOffset	Int
Move5Dwell	Int
Move5HomeDir	Int
Move5HomeMode	Int
Move5RegSelect	Int
Move5RunSpeed	Flt
Move5Type	Int
Move6AccelRate	Flt
Move6DecelRate	Flt
Move6Distance	Int
Move6DistOffset	Int
Move6Dwell	Int
Move6HomeDir	Int
Move6HomeMode	Int
Move6RegSelect	Int
Move6RunSpeed	Flt
Move6Type	Int
Move7AccelRate	Flt
Move7DecelRate	Flt
Move7Distance	Int
Move7DistOffset	Int
Move7Dwell	Int
Move7HomeDir	Int
Move7HomeMode	Int
Move7RegSelect	Int
Move7RunSpeed	Flt
Move7Type	Int
MoveDone	Int
MoveSelectBit0	Int
MoveSelectBit1	Int
MoveSelectBit2	Int
NVLoad	Cmd
NVSave	Cmd
Out1	Int
Out2	Int
Out3	Int
Out4	Int
OutMap1	Int
OutMap2	Int
OutMap3	Int
OutMap4	Int

Identifier	Type
Outputs	Int
PoleCount	Int
PosCmdSet	Int
PosCommand	Int
PosError	Int
PosErrorMax	Int
Position	Int
PulsesFOut	Int
PulsesIn	Int
PulsesOut	Int
PWMDeadBand	Flt
PWMFreq	Flt
RCalData	Int
RCalMAng	Int
RCalMode	Int
RCalTime	Flt
Reg1ActiveEdge	Int
Reg1EncoderPosition	Int
Reg1ResolverPosition	Int
Reg2ActiveEdge	Int
Reg2EncoderPosition	Int
Reg2ResolverPosition	Int
RemoteFB	Int
ResPos	Int
RunStop	Int
SaveCalTable	Cmd
SIAV	Int
SinHarmCoeff1	Flt
SinHarmCoeff2	Flt
SinHarmCoeff4	Flt
SinHarmCoeff5	Flt
SinHarmCoeff7	Flt
SinHarmCoeff8	Flt
SinHarmCoeff10	Flt
SinHarmCoeff11	Flt
SinHarmCoeff13	Flt
SinHarmCoeff14	Flt
SinHarmCoeff16	Flt
SinHarmCoeff17	Flt
SinHarmCoeff19	Flt
StartMove	Int
StopTime	Flt
TableGen	Cmd
Unconfigure	Cmd
VBus	Flt
VBusFTime	Flt
VBusThresh	Flt
VdCmd	Flt
VelCmd	Flt
VelCmd2	Flt
VelCmdA	Flt
VelCmdSrc	Int
VelErr	Flt
VelFB	Flt
VellmtHi	Flt
VellmtLo	Flt
Velocity	Flt
VqCmd	Flt
ZeroSpeedThresh	Flt

The driver converts the PC830 float variables to signed 32-bit data, and provides up to 4 decimal place accuracy. The accuracy is specified by placing a decimal point and the desired decimal point position in parenthesis after the identifier. For example:

Analog Input, with 2 decimal places.

AnalogIn(.00)

Active Run Speed, with 4 decimal places.

ActiveRunSpeed(.0000)

PWM Frequency, with no decimal places.

PWMFreq

### Knowledge of Unit Operation Is Assumed

In all cases, the simple principle of 'pass-through' is maintained: there is no attempt to validate a value in terms of the end use of the unit: both familiarity with the drive functions and knowledge of system operation are assumed.

### Communications

Communications with the Pacific Scientific PC830 is via an RS-232 point to point link, or via RS-485. Default serial communications format is 19200 baud rate, 8 data bits, No parity, and 1 stop bit. The default Device Address is 255, which is the Pacific Scientific PC830 broadcast address. The connection details are described in the tables below.

<b>Paradigm RS232 Port</b>	<b>PC830 RS232 Serial Port, DB-9</b>
Pin 1 (Tx)	Pin 3 (RXD)
Pin 2 (Rx)	Pin 2 (TXD)
Pin 3 (RTS)	
Pin 4 (CTS)	
Pin 5 (Comm.)	Pin 5 (RTN)

In addition a link must be fitted between Pin 3 (RTS) and Pin 4 (CTS) on the Paradigm unit.

<b>Paradigm RS485 Port</b>	<b>PC830 RS485 Serial Port, DB-9</b>
Pin 6 (TxA)	Pin 8 (RXD +)
Pin 7 (TxB)	Pin 9 (RXD -)
Pin 8 (RxA)	Pin 6 (TXD +)
Pin 9 (RxB)	Pin 7 (TXD -)
Pin 10 (Comm.)	Pin 5 (RTN)

In addition a 1k8 resistor must be fitted between Pin 9 (RxB) and Pin 10 (Comm.) on the Paradigm unit.